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ABSTRACT

Word concepts have long been recognized as an integral part of intelligence, and word definition tasks are frequently used to measure them. Entire subtests requiring definitions, usually called vocabulary tests, are common; because of their apparent stability and comparability with overall intelligence, these subtests have been given a preeminent position in intelligence testing. This paper describes the limitations of vocabulary subtests of intelligence scales and presents a comprehensive review of the research on children's definitions. The authors propose that many of the existing problems which surround vocabulary subtests can be alleviated by incorporating the research findings into the scoring and interpretation of these subtests. (Author/LC)

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On Vocabulary Subtests and Children's Definitions

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Running head: On vocabulary subtests

Abstract

The authors describe limitations of vocabulary subtests of intelligence scales. They then present a comprehensive review of the research on children's definitions. The authors propose that many of the existing problems which surround vocabulary subtests can be alleviated by incorporating the research findings into the scoring and interpretation of these subtests.

Word concepts have long been recognized as an integral part of intelligence, and word definition tasks are frequently used to measure them. Entire subtests requiring definitions, usually called Vocabulary Tests, are common, (Wechsler Preschool and Primary Scale of Intelligence, Wechsler Intelligence Scale for Children - Revised, Wechsler Adult Intelligence Scale, Wechsler - Bellevue); and because of their apparent stability and comparability with overall intelligence, these subtests have been given a pre-eminent position in intelligence testing.

There are, however, significant problems surrounding vocabulary subtests; Rapaport, Gill, and Schafer (1968) cite some of them.

> In evaluating vocabulary achievement one must keep in mind, first, that the basic point in the psychology of vocabulary is the relatively refractory nature of vocabulary to deterioration; second, that. . . vocabulary depends for its development more upon original wealth of educational environment than upon late schooling and variety of life experience; third, that when intellectual function is disturbed in the beginning, the lack of vocabulary attainment will reflect it; and fourth. . .the specific quality of its [intellectual function] disturbance . . .also plays a crucial role in the development of vocabulary. (p. 83).

Despite their special status, the scoring of vocabulary subtests

tends to be very simplistic. Matarazzo (1972) in his discussion of the vocabulary tests, addresses some of the frustrations that clinicians encounter with the present scoring procedures.

> What counts is the number of words that he knows. Any recognized meaning is acceptable, and there is no penalty for inelegance of language. So long as the subject shows that he knows what a word means, he is credited with passing score. The general rule, when in doubt, is to match the subject's responses against the acceptable definitions and to score accordingly. However, even the most experienced clinician has difficulty scoring items of the type shown. . .(p. 219).

Rapaport, et al (1968) complain about another apparent failing of the current scoring procedures.

> the nondeteriorative character of vocabulary is really an illusion, and that the basis of this illusion lies in the fact that different levels of definitions of the words are acceptable. Though a patient may use a lower level of vocabulary definition than he did originally, he can still pass. Thus, in the vocabulary misses, only the gross impairments of vocabulary will show up. (p.81).

Finally, Terman and Merrill (1973) writing about the Stanford-Binet Intelligence Scale identify the challenging task the clinician faces but do little to facilitate the successful accomplishment of it.

> It is important for the examiner to realize that the purpose of this vocabulary test is to determine whether the subject knows the meaning of the word, not whether he can give a completely logical definition. Awkwardness of expression is disregarded. It is often necessary to determine by additional questions, as indicated in the testing procedure, whether the meaning is apprehended. (p.232-233).

In short, the scoring procedures for these tests must be supplemented by considerable interpretation. The formal methods to guide the interpretation seem sometimes confusing and incomplete. One approach which might be used is to develop a revised scoring procedure that includes a classification of definition form. Information of this sort would derive from developmental studies of defining style. Such information would reduce the impact of early cultural/educational experiences in favor of more universal, chronologically-based, developmental criteria. Furthermore, when combined with existing information on deviant definition types (Feifel, 1949; Rapaport, et al (1968) it would make the vocabulary subtests more sensitive to deterioration.

This paper presents a brief review of the literature on the evolution of defining in children.

One of the earliest studies of children's definitions was done by Lewis Terman, who was one of the early proponents of performance-based intelligence tests and a founder of American

clinical psychology. Terman's revisions of the French Binet Scale, called the Stanford-Binet, include word definitions as does the Terman-Merrill Vocabulary Test. In 1916, he published the results of a study of noun definitions by children of varying ages. Terman reported that young children define objects in terms of use, (e.g., A ball is to bounce) but by the age of eight two-thirds of his subjects were using forms which were "superior to use." He did not analyze those superior forms.

Piaget (1926, 1928) recognizing the bond between concept-formation and language, linked defining style to cognitive development. Functional definitions were linked to the earlier, more egocentric thinking of younger children (through age eight) while logical or formal definitions were associated with the more formal or objective thinking of older children (beginning at age nine). Piaget's position received partial confirmation in the research of Wolman and Barker (1965) and Swartz and Hall (1972). Wolman and Barker did observe a transition from "concrete" to "abstract" with age and as the number of known vocabulary items grew. Neither Wolman and Barker nor other researchers have been able to describe concrete and abstract in operational terms. The results of Swartz and Hall supported a three-type developmental sequence rather than Piaget's two-type approach to definitions; their study tries to correlate definition types with Piaget's stages of cognitive development. They found that children who preferred functional definitions were five years or younger and performed at Stage I. (egocentric) while those whose definitions were primarily abstract were older (eleven

years) and scored at Stage III. (Objective) in concept development. Little is said of the types of definitions given by children in Stage II., ages seven to nine.

Almost thirty years before the publication of Swartz and Hall's study, Reichard, Schneider, and Rapaport (1944) proposed a three-stage developmental sequence for definitions: concrete, functional, and conceptual. Concrete definitions, such as "the ball is round," are primarily descriptive and were hypothesized by Reichard, et al to be the earliest of the developmental forms. Functional definitions appeared next and were thought to peak at age eight or nine but then taper off in favor of conceptual definitions. This developmental progression was reiterated by Gerstein (1949) who also proposed using it to score the vocabulary subtest of the Wechsler-Bellevue Scale. One year later, Stacey and Portnoy compared the defining strategies of children of borderline intelligence with those of "mental defectives." They found that both preferred functional definitions but that the children with borderline intelligence used more concrete definitions than the other group. These findings threw the developmental sequence of Reichard, et al into question.

In 1969, Al-Issa published a study of children's definitions which supported the three-stage approach, but not in the order proposed by Reichard, et al. Functional definitions were the earliest form and reached their optimum around five years of age, rather than age eight as predicted by Reichard, et al. The concrete stage appeared to come next, followed by the abstract stage.

Al-Issa reported that both functional and concrete definitions decreased with age and that by age ten abstract definitions predominated. Al-Issa's findings were supported by the previously cited study of Swartz and Hall (1972). They used the same set of ten nouns as Wolman and Barker (1965), but found three types of definitions. Like Al-Issa, they found functional definitions to be the earliest form predominating from age five to nine. During this period, functional definitions slowly decreased in percentage while abstract definitions slowly increased. By age eleven, abstract definitions were more frequently used than the other two forms. However, Swartz and Hall also found that concrete definitions remained constant across ages.

The findings of these researchers could be used to enhance the interpretation of vocabulary subtests. Unfortunately, although they defined concrete and functional definition types, the notion of "abstract" or "conceptual" definitions is unclear. Thus, while Al-Issa and the others were testing the three-stage model, another group of researchers, led by Herman Feifel, was developing a definition typology based on the semantic relationship between the stimulus word and the response. In 1949, Feifel analyzed the definitions of normal and "abnormal" subjects (mostly schizophrenics). He found four definition types:

1. Synonym	orange- a fruit
2. Use and description	
Use	orange- you eat it
Description	straw- it's yellow
Combination	orange- you eat it and it's round

3. Explanation	priceless- it's worth a lot of money
4. Other	
Illustration	priceless- a gem
Inferior explanation	scorch- hot
Repetition	puddle- a puddle of water
Demonstration	eyelash- this (points)
	tap- like this (does it)

Unlike most of the other publications we have discussed, Feifel's study includes stimulus words, like priceless, which are not nouns. This addition expands the possible scope of the study.

Feifel matched the two groups of subjects on the basis of chronological age and for overall Stanford-Binet vocabulary score. Despite this he found that the two groups behaved differently. The normals over nine years old tended to give synonym definitions while the abnormals as a whole gave more definitions of the other three types. This meant that the abnormals of all ages behaved like normal children under age nine who also tended to give definitions of types 2, 3, and 4.

The following year, Feifel and Lorge (1950) restructured Feifel's four types of definitions and produced a complex classification of ten types:

1. Synonyms	
A. By itself	
B. Modified by use	straw- hay that cattle eat
C. Modified by description	gown- a long dress
D. Modified by use and description	eyelash- hair over the eye that protects you

E. Modified by degree — tap- touch lightly

2. Use
3. Description
4. Use and description
5. Explanation
6. Demonstration
7. Repetition
8. Illustration
9. Inferior explanation
10. Error
    - A. No explanation — puddle- puddle
    - B. Clang — roar- raw
    - C. Wrong definition — orange- a vegetable
    - D. Incorrect demonstration — eyelash- this (shows eyebrow)
    - E. Omission — word left out of test

They tested nine hundred normal children from ages six to fourteen using the definition items from the vocabulary test of the revised Stanford-Binet Scale (Form L). The younger children were found to use many more use and description, repetitions, illustrations, demonstrations, and inferior explanations; while the older children preferred synonyms of all types and explanations. Feifel and Lorge conclude that the younger children perceive the world as concrete ideas in contrast to the classificatory perspective of older children. This generalization was supported by Wilson (1975) who used factor analysis on the definitions of one hundred children age six through fourteen. Wilson found that Feifel and Lorge's synonym and explanation types could be collapsed into a broader class called "abstract."

Storck and Looft (1973) extended Feifel and Lorge's study to include older adolescents and adults. Their findings generally support those of Feifel and Lorge, but they also found that definition types tend to change little after early adolescence. In their discussion, they generalize to two developmental categories: concrete-action and abstract.

The scoring guidelines which Wechsler (1974) has established for the vocabulary subtest parallel and draw upon the work of the abovementioned researchers, especially Feifel and Lorge. For the Wechsler Intelligence Scale for Children - Revised, as an example, the "General Scoring Principles" include the following definition types which earn full credit.

1. A good synonym
2. A major use
3. One or more definitive features or primary features of objects
4. A general classification
5. A correct figurative use
6. Several less-definitive but correct descriptive features
7. Verbs: a definitive example of action or a causal relation (p. 161).

After Wechsler establishes these classes of good (i.e., full credit) definitions, he goes on to describe some response types that are not as good (i.e., partial credit) or bad (i.e., no credit). However, with these elaborations he has diverged from the research. Instead of examining categories 1 through 7 as possibly having a developmental

sequence themselves, Wechsler has treated them as ideal types. The partial credit definitions are often poorly formed versions of the fully credited types.

1. A vague or less pertinent synonym
2. A minor use
3. An attribute which is correct but not definitive or not a distinguishing feature
4. An example using the word itself
5. A concrete instance of the word
6. A correct definition of a related form of the word.

(pp. 161-162)

None of the research supports a distinction of this nature and it requires a very subjective decision by the clinician. Furthermore, an interpretation of this nature does indeed regard the "inelegance" or "awkwardness" of the response language, despite the previsously cited remarks to the contrary by Matarazzo (1972) and Terman and Merrill (1973).

Litowitz (1977) added a new dimension to the research on children's definitions and the issue of inelegance of language. She clearly distinguished development of the form or syntax of definitions from the development of meaning. She also maintained that the most sophisticated types of definition syntax help reinforce and express the meaning.

Litowitz identified five basic developmental levels of definition type.

Level 1.

Nonverbal statement: (pointing).

Verbal statement which is semantically empty: snap- like this (gesture)

We have already seen non-verbal definitions of this type in the classification systems of Feifel (1949) and Feifel and Lorge (1950) where it was reported to be one of the types preferred by younger children and "abnormal" subjects. In Litowitz' system it expresses meaning without syntactic or verbal form.

Level 2.

Syntactically telegraphic word association to the original stimulus word: shoe- sock; bicycle- the man, a lady; knife- cutting

This level consists of the minimum of syntactic form: a single word or an article plus a noun. Semantically, however, the definition is more complex. It shows meaning linkages or associations which go beyond pointing to the object itself.

Level 3.

Concrete, idiosyncratic example of an actual experience acting as a predicate to the stimulus word: knife- when you're cutting carrots; alphabet- alphabet soup, in the soup, tomatoes and carrots; bicycle- you ride on and you fall off.

These definitions have considerably more syntactic form

than those of Level 2 consisting of prepositional phrases, sequences of nouns, or entire clauses. Some of the definitions at this level would fall into Feifel's (1949) repetition definition type, but all of them share idiosyncratic meaning. Many of the definitions at Level 3 contain the beginning of expressions of function, time, or object qualities.

Level 4.

Beginning of abstraction from individual experience towards general social information. You plus predicate: knife- a knife is when you cut with it. Functional definition (an x is for y-ing or to y with): bicycle- a bicycle is for riding.

Level 4 is the functional definition which we have already seen in most of the other research. Unlike the more primitive expressions of function of Level 3, these definitions clearly express an awareness of general function rather than function tied to a particular event. Thus, a knife is "when you cut with it" rather than only "when you're cutting carrots." Structurally, these definitions are usually complete sentences which often take the form "you could_____;" "when you _____;" or "x is for y." This last type of Level 4 definition is an illustration of how syntax is beginning to support meaning. At level 4, the child reports that a bicycle is "for riding" while earlier levels would at most have contained responses like "riding" or "when you're riding fast."

Level 5.

Aristotelian definition (an x is [a kind of] y which [has/does] z): A knife is a kind of tool which has a blade and can cut.

Aristotelian definitions are complete sentences which state the category or classification of the object as well as its principal function or characteristics. In structure, the Aristotelian definition provides considerable support to the expression of meaning. We have already seen parts of this type of definition. Feifel's (1949) synonym definition type, which was found to be used by older children, is really a classification and satisfies one requirement of the Aristotelian definition. Wechsler's (1974) scoring guidelines, described above, capture independent parts of an Aristotelian definition but fail to credit its complex gestalt. An Aristotelian definition, Level 5, would not score higher than a functional definition, Level 4, in Wechsler's structure.

Litowitz found examples of only four of the five levels. There were no complete Aristotelian definitions in her sample. According to Litowitz, young children do not have adequate information to produce Aristotelian definitions. However, there were forms, such as "a bicycle is something you ride," which appeared to be the beginning of an Aristotelian form. She also identified transitional forms between Levels 2 and 3:

Level 2½ A.

Repetition of word or of an association: clock- time, time to read; swing- swing on it.

Level 2½ B.

Lists of attributes: bicycle- its got wheels, a chain, handle bars. . .

Level 2½ C.

Affective marker: nuisance- when people are bad

A subsequent study by Wehren, DeLisi, and Arnold (1981) supports Litowitz' syntactic levels but uses a five-stage classification system which is reminiscent of the three-stage model we have discussed: functional; concrete; relational; combinatorial; no response. Relational definitions use analogy, as in this definition of spoon "like a fork and knife." Combinatorial definitions are simply combinations of any of the first three types of definitions. They studied the definitions of children and adults and found that younger children preferred functional definitions while older children and adults preferred relational and combinatorial forms. They also noted that older subjects tended to use concrete-perceptual information to modify, but not replace, functional information. They conclude that functional information forms the core of definition content to which perceptual information is later added. This conclusion is supported by Katherine Nelson's (1978) research on young children's cognition.

The developmental information we have discussed can enable a diagnostician to avoid some of the problems mentioned at the beginning

of this paper. The standard scoring guidelines provide inadequate sensitivity to the age appropriateness of a child's responses. Alternative guidelines could, for example, examine the responses for evidence of later-developing defining types to determine whether the child is capable of using them. One could also see if the child's preferred defining style is characteristic of an earlier stage of development. One could compare normal age-appropriate definitions with deviant definition types (Rapaport, et al, 1968). One could also become much more sensitive to deterioration of defining style, such as Rapaport, et al (1968) observed in their patients. Furthermore, the separation of syntactic form from meaning could truly minimize the impact of "inelegant language" on test scores.

The research we have discussed is limited. We need more detailed understanding of the development of the syntax and content of children's definitions, especially those of older children and children with different cultural backgrounds. The work of Markowitz and Moses (1981) and Markowitz(1982) which reveals that experience has an impact on the definitions of school-aged children is a step in this direction. Much more work remains to be done before non-developmental information about children's definitions can be incorporated into the interpretation of verbal test scores.

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